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DRAWINGS ATTACHED

1 339 939

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(54) IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF TOMATO PULP

(71) We, H. J. HEINZ COMPANY LIMITED, a Company incorporated under the Laws of Great Britain, of Hayes Park, Hayes, Middlesex, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to the manufacture of tomato pulp and more especially to the manufacture of hot-break tomato pulp by a continuous method.

It is beneficial, in the manufacture of tomato pulp, to heat chopped or broken tomatoes to a temperature above that necessary to minimise the breakdown of pectin by enzyme activity, and thereby retain the maximum benefit from the thickening properties of pectin in the ultimate tomato paste, especially when the paste is to be employed in the production of tomato ketchup.

It is a main object of the present invention to provide an improved method and apparatus for the manufacture of hot-break tomato pulp in which whole tomatoes are scalded as they are chopped and there is little or no enzyme activity.

According to the invention a method of producing hot-break tomato pulp comprises feeding whole tomatoes into a falling stream of scalded tomato pulp, the temperature of which is at a value to minimise enzyme activity in the mixture of incoming tomatoes and scaled pulp, chopping the tomatoes as they are carried downwardly in that stream, recirculating the chopped pulp, reheating the pulp to said temperature as it is recirculated, feeding the hot recirculated pulp downwardly to form said falling stream, and pumping off a proportion of the recirculating pulp at a rate commensurate with the rate of feed of whole tomatoes.

Preferably the pulp is reheated to a temperature such that the mixture of incoming tomatoes and scalded pulp is at least 85°C. In one way of operating the invention the pulp is reheated to a temperature in the range 94°C to 99°C.

The invention also provides apparatus for producing hot-break tomato pulp comprising a scald tank having at its top inlet means for scalded tomato pulp and for whole tomatoes with associated feeding means for feeding whole tomatoes through the inlet means at a controlled rate, chopping means mounted in the tank beneath the inlet means, an outlet for pulp at the bottom of the tank connected by a pump to a heat exchanger, means for regulating the heat exchanger to raise the pulp temperature to a value such that the temperature of mixed tomatoes and pulp entering the chopping means is at least 85°C, a recirculation duct connecting the outlet from the heat exchanger to the inlet means in the top of the scald tank, and a branch take-off pipe from the recirculation duct connected to a pump operable to pump hot-break pulp from the recirculation duct at a rate commensurate with the rate of feed of whole tomatoes by said feed means.

Preferably the inlet means comprises a whole tomato inlet entering laterally into a hopper in the upper part of the scald tank, the recirculation duct also entering the hopper from above. The recirculation duct may be provided with a steam jacket for raising the pulp temperature during its passage from the heat exchanger to the inlet means.

The invention further comprehends hot-break tomato pulp produced by the above-mentioned method, and tomato products produced therefrom.

In order that the invention may be more clearly understood an embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a diagrammatic elevation, partly in section, of a tomato chopping and scalding apparatus for carrying out the method of the invention, and

Figure 2 is a vertical section on line II—II of Figure 1.

Referring to the drawings, graded and washed whole tomatoes at a temperature of about 20°C are fed from a sorting conveyor (not shown) at a rate of about 100 kg/min. along a feed screw conveyor 1 through a side inlet duct 8 and thence into a scald tank indicated generally at 2.

The scald tank 2 is made of stainless steel, and consists of a main body 3, for example of cylindrical form, the bottom of which is inclined downwards to an outlet duct 4 which is connected to a high capacity centrifugal pump 5. The scald tank has a closed top 6 through the centre of which there passes a downwardly directed wide inlet duct 7, for recirculated scalded pulp. The inlet duct 7 extends a little way down into the scald tank and terminates in an open bottom end 10.

A side inlet duct 8 enters laterally into the scald tank through the side of the tank, and terminates adjacent to the bottom end 10 of the inlet duct 7.

A chopper 11 with rotary stainless steel blades 12 mounted on a horizontal shaft 13 is mounted in the scald tank beneath the end 10 of the inlet duct 7, and there is a hopper or tundish 14 above the chopper 11. Both the end 10 of the pulp inlet duct 7 and the end of the whole tomato inlet duct 8 are within the hopper 14, so that it feeds a mixture of whole tomatoes and recirculated scalded pulp downwardly to the chopper. A safety overflow pipe 15 is connected to a vent in the closed top 6 of the scald tank.

Near the bottom of the cylindrical main body 3 of the scald tank a level control float 16 is mounted in the tank to maintain a level of pulp 17 in the scald tank being connected to a regulator (not shown) for a variable speed pump 22. A further safety control float 9 may be provided at a higher level and arranged to start and stop the tomato feed conveyor 1.

An outlet duct 18 from the pump 5 is connected to a tubular heat exchanger 19 of known kind, and a recirculation duct 20 with steam jacket 23 connects the outlet from the heat exchanger 19 to the inlet duct 7 leading into the top of the scald tank 2.

A branch take-off pipe 21 is fixed into the recirculation duct 20 just where it commences to bend downwardly to lead to the inlet duct 7, and this branch pipe 21 is connected to the variable-speed pump 22 which is operable to pump hot-break tomato pulp from the duct 20 at a rate commensurate with the rate of feeding of whole tomatoes by the feed conveyor 1.

A temperature control probe 25 fixed in the recirculation duct 20 is operable to control a steam supply, not shown, to the tubular heat exchanger 19 and the steam jacket 23.

In operation, immediately the whole tomatoes fall from the end of the branch inlet duct 8 into the inlet duct 7 and thence into the tundish 14, they are swamped by a falling stream 26 of scalded tomato pulp, for example at a temperature of 99°C which sweeps across the end of side inlet duct 8. The proportion of the pulp recirculated is such that the whole tomatoes are swamped by about eighteen times their weight of scalded pulp, and the temperature of the mixture of incoming tomatoes and scalded pulp is at least 85°C.

The whole tomatoes are carried downwardly by the scalding stream 26 through the aperture in the bottom of the tundish to the chopper 11 so that the tomatoes are chopped and scalded simultaneously as they are carried downwardly in the hot pulp stream. When, as described above the pulp is reheated to 99°C all broken surfaces of the tomatoes are immediately heated to an average temperature of 96°C, thus ensuring complete destruction of pectic enzymes and minimum loss of pectine caused by enzyme action.

After chopping, the scalded pulp falls to the bottom of the tank 2 to maintain the level of the pulp 17, and sanitary steam may be injected into the pulp by a sparge pipe (not shown) to maintain an average temperature of about 96°C in the pulp 17. The pulp is pumped by the pump 5 to the tubular heat exchanger 19, in which the pulp is reheated to 99°C, and then along the recirculation duct 20, in which the temperature is maintained by the steam jacket 23, at a rate of for example 1,800 litres per minute. This ensures a high rate of supply of pulp at 99°C into the falling stream 26 which engulfs the whole tomatoes just prior to chopping.

Scalded pulp is pumped from the recirculated pulp, along the branch take-off pipe 21 by the pump 22 at a rate of about 100 kg/min, to balance the rate at which whole tomatoes are fed to the scald tank. The outlet pipe 27 from the pump 22 carries the pulp to a holding tank (not shown) from which the pulp passes through plant of known kind for the extraction of skins and seeds followed by evaporation of the pulp to produce tomato paste which is sealed in containers for shipping. Alternatively the pulp may be further processed in known manner for conversion into tomato juice.

The invention thus provides a new and compact hot-break method and apparatus which ensures that substantially all the pectin present in the tomatoes is retained in the pulp, and which is compact and runs continuously with a minimum of supervision, being especially adapted for operation on site so that freshly picked tomatoes can be rapidly processed into hot-break tomato-paste or juice for shipping from the site.

WHAT WE CLAIM IS:—

1. A method of producing hot-break tomato pulp comprising feeding whole tomatoes into a falling stream of scalded tomato pulp the temperature of which is at a value to minimise enzyme activity in the mixture of incoming tomatoes and scalded pulp, chopping the tomatoes as they are carried downwardly in that stream, recirculating the chopped pulp, reheating the pulp to said temperature as it is recirculated, feeding the hot recirculated pulp downwardly to form said falling stream, and pumping off a proportion of the recirculating pulp at a rate commensurate with the rate of feed of whole tomatoes.

2. A method according to claim 1, comprising reheating the pulp to a temperature such that the mixture of incoming tomatoes and scalded pulp is at least 85°C.

3. A method according to claim 2, comprising reheating the pulp to a temperature in the range 94°C to 99°C.

4. Apparatus for producing hot-break tomato pulp, comprising a scald tank having at its top inlet means for scalded tomato pulp and for whole tomatoes with associated feeding means for feeding whole tomatoes through the inlet means at a controlled rate, chopping means mounted in the tank beneath the inlet means, an outlet for pulp at the bottom of the tank connected by a pump to a heat exchanger, means for regulating the heat exchanger to raise the pulp temperature to a value such that the temperature of mixed tomatoes and pulp entering the chopping means is at least 85°C, a recirculation duct connecting the outlet from the heat exchanger to the inlet means in the top of the scald tank, and a branch take-off pulp from the recirculation duct connected to a pump operable to pump hot break pulp from the recirculation duct at a rate commensurate with the rate of feed of whole tomatoes by said feeding means.

5. Apparatus according to claim 4, wherein the inlet means comprises a whole tomato inlet entering laterally into a hopper in the upper part of the scald tank, the recirculation duct also entering the hopper from above.

6. Apparatus according to claims 4 or 5, wherein the recirculation duct is provided with a steam jacket for raising the pulp temperature during its passage from the heat exchanger to the inlet means.

7. A method of producing hot-break tomato pulp substantially as herein described with reference to the accompanying drawings.

8. Apparatus for producing hot-break tomato pulp substantially as herein described with reference to the accompanying drawings.

9. Hot-break tomato pulp produced by a method according to any one of claims 1 to 3 or claim 7, and tomato products produced therefrom.

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1339939 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

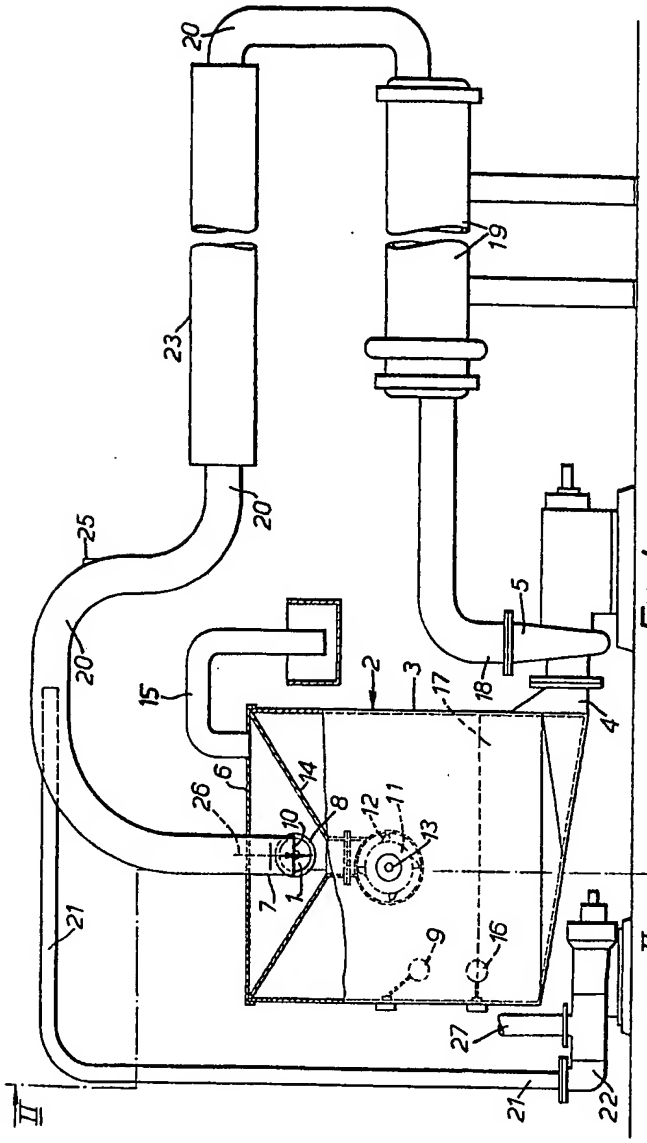

FIG. 1.

1339939 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

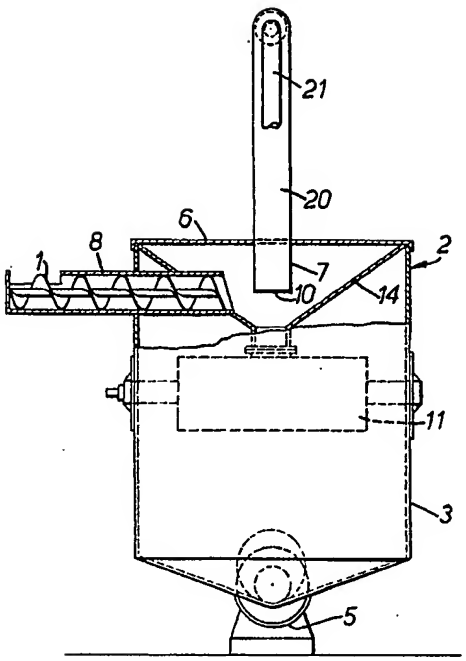

FIG.2.